

TRANSMITTAL OF APPEAL BRIEF (Large Entity)

Docket No.
EN997064

In Re Application Of: K. Covert et al

COPY

Serial No:
09/274,935Filing Date
March 23, 1999Examiner
Alexander MarkoffGroup Art Unit
1746Invention: COPPER CLEANING COMPOSITIONS, PROCESSES AND PRODUCTS DERIVED THEREFROM
COPY OF PAPERS
ORIGINALLY FILEDTO THE ASSISTANT COMMISSIONER FOR PATENTS:

Transmitted herewith in triplicate is the Appeal Brief in this application, with respect to the Notice of Appeal filed on

The fee for filing this Appeal Brief is: \$320.00

☐ A check in the amount of the fee is enclosed.☐ The Commissioner has already been authorized to charge fees in this application to a Deposit Account. A duplicate copy of this sheet is enclosed.☒ The Commissioner is hereby authorized to charge any fees which may be required, or credit any overpayment to Deposit Account No. 09-0457

A duplicate copy of this sheet is enclosed.

09/16/2002
01 FC:119

320.00 CH



Signature

Dated: 8/30/02

RECEIVED
SEP - 5 2002
TC 1700 MAIL ROOMRECEIVED
202 SEP - 4 PM 2:48
BOARD OF PATENT APPEALS
AND INTERFERENCES

I certify that this document and fee is being deposited on 8/30/02 with the U.S. Postal Service as first class mail under 37 C.F.R. 1.8 and is addressed to the Assistant Commissioner for Patents, Washington, D.C. 20231.

Signature of Person Mailing Correspondence

Mark Levy

Typed or Printed Name of Person Mailing Correspondence

cc:

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re patent application of:) Art Unit: 1746
K. Covert et al) Examiner: Alexander Markoff
Serial No.: 09/274,935) Date: August 27, 2002
Filed: March 23, 1999) Atty. Docket No.: EN997064
For: COPPER CLEANING)
COMPOSITIONS, PROCESSES AND)
PRODUCTS DERIVED THEREFROM)

APPEAL BRIEF

Honorable Commissioner of Patents and Trademarks
Washington, DC 20231

S I R:

This Appeal is taken from the FINAL REJECTION of claims 1 through 20 as presented in the Office Action of December 4, 2001 (Paper No. 10), in the above-identified application.

The Commissioner is hereby authorized to charge any fees in connection with this appeal or with other matters before the PTO, to the undersigned's Deposit Account No. 19-0077.

09/19/2002 BHINES 00000002 190077 09274935
01 FC:115 110.00 CH
Docket No. EN997064

#20
J.B.
9-13-02

RECEIVED
SEP -5 2002
TC 1700 MAIL ROOM

RECEIVED
SEP -4 PM 2:48
BOARD OF PATENT APPEALS
AND INTERFERENCES

REAL PARTY IN INTEREST

The real party in interest hereto is Appellants' assignee. The interest in the invention was assigned by the inventors, to International Business Machines Corporation at the time of filing the application, and was recorded on Reel No. 010023, Frame No. 0741.

RELATED APPEALS AND INTERFERENCES

This appeal is the first appeal before the Office.

STATUS OF THE CLAIMS

All of the presently pending claims 1 through 20 now stand FINALLY REJECTED as of December 4, 2001 (Paper No. 10), which was reaffirmed in the Advisory Actions of March 29, 2002 (Paper No. 12), April 19, 2002 (Paper No. 15), and May 24, 2002 (Paper No. 18).

The rejection of claims 1 through 20 is hereby appealed.

STATUS OF THE AMENDMENTS

The subject patent application was filed on March 23, 1999. An Office Action rejecting claims 1 through 20 was mailed on December 21, 2000 (Paper No. 5). An Amendment and Affidavit were filed on April 4, 2002. An Office Action again rejecting claims 1 through 20 was mailed on June 19, 2001. An Amendment was submitted on May 10, 2001. An Office Action finally rejecting claims 1 - 20 was mailed on December 4, 2001 (Paper No. 10). A Response After Final Office Action was filed on March 14, 2002. A first Advisory Action maintaining the rejection of claims was mailed on March 29, 2002 (Paper No. 12). A Response to the first Advisory Action was filed on April 11, 2002. A second Advisory Action maintaining rejection of the claims was mailed on April 19, 2002 (Paper No. 15). A Response to the second Advisory Action was filed on May 9, 2002. A third Office Action, maintaining rejection of the claims was mailed on May 24, 2002 (Paper No. 18). Applicants filed a Notice of Appeal on July 2, 2002.

SUMMARY OF THE INVENTION

The invention comprises microetching techniques for removing a small layer of copper from copper features forming part of a printed circuit board. The etchants used are many

which have been used before, but the microetching techniques manage their use so that large quantities of copper are not removed. The copper is selectively removed in the present invention by applying an inorganic acid echant, persulfate and phosphate salts. Microetching techniques are of recent vintage, and it is believed would not have been commonly in use before 1993.

ISSUES

Claims 1, 2, 5, 6, 8, 9 and 13 were finally rejected over the Japanese Reference No. JP 5-148,658, as anticipated under 35 U.S.C. §102(b). Claims 14 through 20 were finally rejected over the Japanese Reference No. JP 5-148,658, as unpatentable under 35 U.S.C. §103(a). Claims 3, 4, and 7 were finally rejected as unpatentable over the Japanese Reference No. JP 5-148,658, in view of U.S. Patent No. 4,238,279 (TSUBAI et al) under 35 U.S.C. §103(a). Claims 10 through 12 were finally rejected as unpatentable over the Japanese Reference No. JP 5-148,658, in view of U.S. Patent No. 5,855,805 (ARABINICK) under 35 U.S.C. §103(a).

GROUPING OF THE CLAIMS

The claims cannot be grouped together, taking into account that claims 1 through 16 recite a microetching process for cleaning copper surfaces without removing bulk copper, and claims 17 through 20 recite methods of manufacturing intermediate circuit board structures.

ARGUMENT

The Honorable Board is respectfully requested to reverse the rejection of claims 1 through 20. At the time of filing the above-identified application, microetching as a process was first coming into use in the industry, to the best of this Attorney's knowledge and belief. This casts doubt on whether the main reference, JP 5-148,658, circa 1993, would even be relevant to the techniques being taught in the subject specification. In corroboration of this assumption is the admission by the Office in the FINAL REJECTION, (Office Action mailed December 4, 2001), page 3, line 7, that the cited Japanese reference "does not specify the specific substrates and conventional steps of the process of manufacturing of integrated circuits recited by the claims."

In the very description of this invention, Appellants state that despite using old substances for etching, the details of the technique prevent the bulk removal of copper common to non-microetching techniques. Therefore, with all due respect to the personnel of the USPTO, it is clear that the reference was probably not practicing microetching. This is particularly true by contrasting the large amount of method steps and detail in Appellants' specification. Can claims 17 through 20 be rejected over JP 5-148,658 alone, on the basis of what is admitted to be a lack of detail of structure? The much earlier reference to TSUBAI et al circa 1980, used in combination to reject claims 3, 4, and 7, does not appear to comprise the microetching techniques called for by Appellants. Therefore, either alone or in combination, the purpose of the invention is not shown by the cited references.

Irrespective of whether the Office makes that decision in Appellant's favor on that basis, however, it is questionable whether the rejection of claims 1, 2, 5, 6, 8, 9, and 13 as anticipated over the aforementioned JP 5-148,658 reference under 35 U.S.C. §102(b) is valid.

In the first instance, it is of significance that the purpose of the Japanese reference is almost diametrically opposite to those of Appellants' invention. Bulk copper removal is not the problem for this Japanese reference. The

Japanese reference has a whisker forming problem, not a bulk copper removal problem. Appellants, on the other hand, are using much finer copper wire thicknesses. The Japanese reference is being read into Appellants' invention, and it appears that where it coincides with similar chemistry, it fails by being an opposite teaching (i.e., the problem of growth of the copper (whiskers) versus Applicants' problem of bulk copper removal).

It appears that the Office has not addressed the above arguments with enough specificity throughout the prosecution. Rather, the prosecution seems to have focused upon the fact of whether or not Appellants are teaching the use of nitric acid. Pages 3 and 4 of the specification specifically eschews the use of nitric acid as being too environmentally dangerous, and therefore should not be used in microetching; there is a problem of toxic byproducts. The Japanese reference uses nitric acid, as does TSUBAI et al.

Appellants on page 13, lines 9 through 11 speak of nitric acid. The Office interprets this as contrary to Appellants' purposes. This is an obvious error because all through the specification, Appellants specifically refrain from its use. Even claim 5, which lists acid substances, does not recite nitric acid. Had Appellants wanted or intended to use nitric acid, they would have included it in claim 5. More

importantly however, Appellants believe that the statement on page 13, lines 9 through 11, does not actually suggest the intended use of nitric acid. What was said was that it was "not preferred due to toxic byproducts such as nitrogen oxides." This is precisely in keeping with the statements on page 3 of the specification, and additionally as one of the advantages in paragraph (f) of the Summary of Invention, page 9 of the specification: "a stable, environmentally acceptable, and non-hazardous microetchant formulation."

The Office has inferred from that one sentence that the references that use nitric acid, viz., JP 5-148,658 and TSUBAI et al, are sufficient teachings of Appellants' invention. It is respectfully believed that this is a great leap of logic, particularly in view of the aforementioned Office admission that the Japanese reference does not teach the method steps, or structure of microelectronics.

The one cited reference that actually refers to microetchants is ARABINICK. The combination of ARABINICK with JP 5-148,658 to reject claims 10 through 12 does not teach the claimed invention, because ARABINICK does not teach the combination of etchant substances recited in claims 10 through 12. The Office admits in the Final Rejection (page 5, line 9) that the reference does not recite the specific surfactant claimed. The difference is not made up by the Japanese

reference. The Office states that "the use of the surfactants disclosed by ARABINICK in the method of JP5148658 for their primary purpose with reasonable expectation of adequate results because ARABINICK teaches that the use of these surfactants improves the process." This does not make sense, since the Office admitted just prior to this, that ARABINICK does not teach the surfactants of Appellants. In addition, the Office previously admitted that JP 5-148,658 did not teach the details of the invention.

Appellants respectfully believe that the rejections do not make sense, and that the cited references teach away from the invention, rather than towards the invention. More importantly, none of them, with the exception of ARABINICK, is particularly relevant.

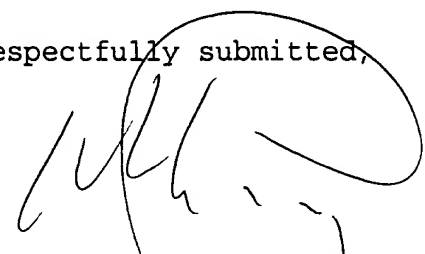
CONCLUSION

The Honorable Board is respectfully requested to reverse the rejection of claims 1 through 20, and allow the subject application to issue as a patent.

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to:
Commissioner of Patents and Trademarks
Washington, D.C. 20231

on 8/30/02
(Date of Deposit)
8/30/02
Mark Levy, Reg. 29188 (Date)
Attorney

Respectfully submitted,


Mark Levy
Registration No. 29,188
Attorney for Appellants
SALZMAN & LEVY
Press Building - Suite 902
19 Chenango Street
Binghamton, New York 13901

Phone: (607) 722-6600

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re patent application of:) Art Unit: 1746
K. Covert et al) Examiner: Alexander Markoff
Serial No.: 09/274,935) Date: August 27, 2002
Filed: March 23, 1999) Atty. Docket No.: EN997064
For: COPPER CLEANING)
 COMPOSITIONS, PROCESSES AND)
 PRODUCTS DERIVED THEREFROM)

APPEAL BRIEF

Honorable Commissioner of Patents and Trademarks
Washington, DC 20231

S I R:

This Appeal is taken from the FINAL REJECTION of claims 1 through 20 as presented in the Office Action of December 4, 2001 (Paper No. 10), in the above-identified application.

The Commissioner is hereby authorized to charge any fees in connection with this appeal or with other matters before the PTO, to the undersigned's Deposit Account No. 19-0077.

REAL PARTY IN INTEREST

The real party in interest hereto is Appellants' assignee. The interest in the invention was assigned by the inventors, to International Business Machines Corporation at the time of filing the application, and was recorded on Reel No. 010023, Frame No. 0741.

RELATED APPEALS AND INTERFERENCES

This appeal is the first appeal before the Office.

STATUS OF THE CLAIMS

All of the presently pending claims 1 through 20 now stand FINALLY REJECTED as of December 4, 2001 (Paper No. 10), which was reaffirmed in the Advisory Actions of March 29, 2002 (Paper No. 12), April 19, 2002 (Paper No. 15), and May 24, 2002 (Paper No. 18).

The rejection of claims 1 through 20 is hereby appealed.

STATUS OF THE AMENDMENTS

The subject patent application was filed on March 23, 1999. An Office Action rejecting claims 1 through 20 was mailed on December 21, 2000 (Paper No. 5). An Amendment and Affidavit were filed on April 4, 2002. An Office Action again rejecting claims 1 through 20 was mailed on June 19, 2001. An Amendment was submitted on May 10, 2001. An Office Action finally rejecting claims 1 - 20 was mailed on December 4, 2001 (Paper No. 10). A Response After Final Office Action was filed on March 14, 2002. A first Advisory Action maintaining the rejection of claims was mailed on March 29, 2002 (Paper No. 12). A Response to the first Advisory Action was filed on April 11, 2002. A second Advisory Action maintaining rejection of the claims was mailed on April 19, 2002 (Paper No. 15). A Response to the second Advisory Action was filed on May 9, 2002. A third Office Action, maintaining rejection of the claims was mailed on May 24, 2002 (Paper No. 18). Applicants filed a Notice of Appeal on July 2, 2002.

SUMMARY OF THE INVENTION

The invention comprises microetching techniques for removing a small layer of copper from copper features forming part of a printed circuit board. The etchants used are many

which have been used before, but the microetching techniques manage their use so that large quantities of copper are not removed. The copper is selectively removed in the present invention by applying an inorganic acid echant, persulfate and phosphate salts. Microetching techniques are of recent vintage, and it is believed would not have been commonly in use before 1993.

ISSUES

Claims 1, 2, 5, 6, 8, 9 and 13 were finally rejected over the Japanese Reference No. JP 5-148,658, as anticipated under 35 U.S.C. §102(b). Claims 14 through 20 were finally rejected over the Japanese Reference No. JP 5-148,658, as unpatentable under 35 U.S.C. §103(a). Claims 3, 4, and 7 were finally rejected as unpatentable over the Japanese Reference No. JP 5-148,658, in view of U.S. Patent No. 4,238,279 (TSUBAI et al) under 35 U.S.C. §103(a). Claims 10 through 12 were finally rejected as unpatentable over the Japanese Reference No. JP 5-148,658, in view of U.S. Patent No. 5,855,805 (ARABINICK) under 35 U.S.C. §103(a).

GROUPING OF THE CLAIMS

The claims cannot be grouped together, taking into account that claims 1 through 16 recite a microetching process for cleaning copper surfaces without removing bulk copper, and claims 17 through 20 recite methods of manufacturing intermediate circuit board structures.

ARGUMENT

The Honorable Board is respectfully requested to reverse the rejection of claims 1 through 20. At the time of filing the above-identified application, microetching as a process was first coming into use in the industry, to the best of this Attorney's knowledge and belief. This casts doubt on whether the main reference, JP 5-148,658, circa 1993, would even be relevant to the techniques being taught in the subject specification. In corroboration of this assumption is the admission by the Office in the FINAL REJECTION, (Office Action mailed December 4, 2001), page 3, line 7, that the cited Japanese reference "does not specify the specific substrates and conventional steps of the process of manufacturing of integrated circuits recited by the claims."

In the very description of this invention, Appellants state that despite using old substances for etching, the details of the technique prevent the bulk removal of copper common to non-microetching techniques. Therefore, with all due respect to the personnel of the USPTO, it is clear that the reference was probably not practicing microetching. This is particularly true by contrasting the large amount of method steps and detail in Appellants' specification. Can claims 17 through 20 be rejected over JP 5-148,658 alone, on the basis of what is admitted to be a lack of detail of structure? The much earlier reference to TSUBAI et al circa 1980, used in combination to reject claims 3, 4, and 7, does not appear to comprise the microetching techniques called for by Appellants. Therefore, either alone or in combination, the purpose of the invention is not shown by the cited references.

Irrespective of whether the Office makes that decision in Appellant's favor on that basis, however, it is questionable whether the rejection of claims 1, 2, 5, 6, 8, 9, and 13 as anticipated over the aforementioned JP 5-148,658 reference under 35 U.S.C. §102(b) is valid.

In the first instance, it is of significance that the purpose of the Japanese reference is almost diametrically opposite to those of Appellants' invention. Bulk copper removal is not the problem for this Japanese reference. The

Japanese reference has a whisker forming problem, not a bulk copper removal problem. Appellants, on the other hand, are using much finer copper wire thicknesses. The Japanese reference is being read into Appellants' invention, and it appears that where it coincides with similar chemistry, it fails by being an opposite teaching (i.e., the problem of growth of the copper (whiskers) versus Applicants' problem of bulk copper removal).

It appears that the Office has not addressed the above arguments with enough specificity throughout the prosecution. Rather, the prosecution seems to have focused upon the fact of whether or not Appellants are teaching the use of nitric acid. Pages 3 and 4 of the specification specifically eschews the use of nitric acid as being too environmentally dangerous, and therefore should not be used in microetching; there is a problem of toxic byproducts. The Japanese reference uses nitric acid, as does TSUBAI et al.

Appellants on page 13, lines 9 through 11 speak of nitric acid. The Office interprets this as contrary to Appellants' purposes. This is an obvious error because all through the specification, Appellants specifically refrain from its use. Even claim 5, which lists acid substances, does not recite nitric acid. Had Appellants wanted or intended to use nitric acid, they would have included it in claim 5. More

importantly however, Appellants believe that the statement on page 13, lines 9 through 11, does not actually suggest the intended use of nitric acid. What was said was that it was "not preferred due to toxic byproducts such as nitrogen oxides." This is precisely in keeping with the statements on page 3 of the specification, and additionally as one of the advantages in paragraph (f) of the Summary of Invention, page 9 of the specification: "a stable, environmentally acceptable, and non-hazardous microetchant formulation."

The Office has inferred from that one sentence that the references that use nitric acid, viz., JP 5-148,658 and TSUBAI et al, are sufficient teachings of Appellants' invention. It is respectfully believed that this is a great leap of logic, particularly in view of the aforementioned Office admission that the Japanese reference does not teach the method steps, or structure of microelectronics.

The one cited reference that actually refers to microetchants is ARABINICK. The combination of ARABINICK with JP 5-148,658 to reject claims 10 through 12 does not teach the claimed invention, because ARABINICK does not teach the combination of etchant substances recited in claims 10 through 12. The Office admits in the Final Rejection (page 5, line 9) that the reference does not recite the specific surfactant claimed. The difference is not made up by the Japanese

reference. The Office states that "the use of the surfactants disclosed by ARABINICK in the method of JP5148658 for their primary purpose with reasonable expectation of adequate results because ARABINICK teaches that the use of these surfactants improves the process." This does not make sense, since the Office admitted just prior to this, that ARABINICK does not teach the surfactants of Appellants. In addition, the Office previously admitted that JP 5-148,658 did not teach the details of the invention.

Appellants respectfully believe that the rejections do not make sense, and that the cited references teach away from the invention, rather than towards the invention. More importantly, none of them, with the exception of ARABINICK, is particularly relevant.

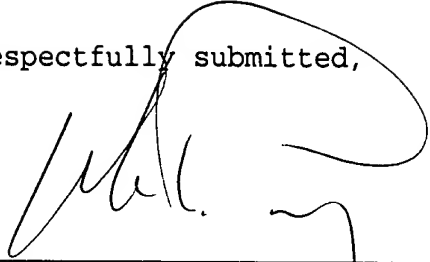
CONCLUSION

The Honorable Board is respectfully requested to reverse the rejection of claims 1 through 20, and allow the subject application to issue as a patent.

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to:
Commissioner of Patents and Trademarks
Washington, D.C. 20231

on 8/3/02 (Date of Deposit)
8/3/02 (Date)
Mark Levy, Reg. 29188
Attorney

Respectfully submitted,


Mark Levy
Registration No. 29,188
Attorney for Appellants
SALZMAN & LEVY
Press Building - Suite 902
19 Chenango Street
Binghamton, New York 13901

Phone: (607) 722-6600